

## TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT

### DECONTAMINATION OF WET STORAGE BASIN IN BUILDING 327

**Identification No.:** RL-DD081

**Date:** November 2001

**Program:** 300 Area Facility Transition

**OPS Office/Site:** Richland Operations Office/Hanford Site

**PBS No:** RL-RC06

**Waste Stream:** Material with alpha, beta, and gamma contamination that is dispersible and likely embedded

**TSD Title:** N/A

**Operable Unit (if applicable):** N/A

**Waste Management Unit (if applicable):** N/A.

**Facility:** Building 327

#### **Priority Rating:**

This entry addresses the "Accelerated Cleanup: Paths to Closure (ACPC)" priority:

- ☐ 1. Critical to the success of the ACPC.
- ☒ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays).
- ☐ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

**Need Title:** Decontamination of Wet Storage Basin in Building 327

**Need/Opportunity Category:** *Technology Opportunity* -- The Site desires an alternative to the current baseline technology.

**Need Description:** A method to remove radioactive contaminants that have migrated into the surface of the concrete of the 327 (sample) storage basins. The contamination exists as a "bathtub ring" and as deposits of throughout the sides and bottom of the concrete basins. The contamination is the result of storing irradiated fuel samples prior to, during and after destructive examination and storage of breached Cesium capsules. The primary contaminants are mixed fission products with potential for transuranics. The basin has been coated (most likely with epoxy). The basin cannot be emptied of water until the contamination is either removed or additional shielding is provided. The water also acts as a contaminant containment barrier. No high-efficiency particulate air (HEPA) filtration system exists at either basin.

#### **Schedule Requirements:**

Earliest Date Required: (01/01/02)

Latest Date Required: (09/30/03)

***Problem Description:*** Contamination represents an immediate worker exposure concern as well as a long-term environmental concern. The specific need is for the decontamination of highly contaminated (wet) storage basins in the 327 Facility. The Large Basin (3.1m x 4.6m x 5.2m) and Small Basin (1.8m x 2.4m x 3.1m) are connected by a 0.5m wide, 3.1m deep canal. The basins are coated concrete. In addition to the decontamination of the basins, disposal of a large legacy ion exchange column must be accomplished.

The storage basins are contaminated with cesium, strontium, uranium, and transuranic components. There is a concentration of contaminants in a “bathtub ring” located near the surface of the water. In addition to the “bathtub ring,” radioactive contamination has penetrated to varying depths into the concrete wall and floor surfaces.

Current decontamination practices include physical removal of the concrete surface (i.e., scabbling, sand blasting, etc.). None of these have been demonstrated underwater. Some contaminated concrete surfaces have also been painted and/or coated with a fixative. Project requirements may include removal of such coatings prior to decontamination of the concrete.

Waste minimization and remote handling methods are of prime importance.

***Potential Life Cycle Cost Savings of Needs (in \$000s) and Costs Savings Explanation:***  
TBD

***Benefit to the Project Baseline of Filling Need:*** Remediation of basin contamination would represent a significant source-term reduction in the facility and ALARA improvement.

***Relevant PBS Milestone:***

TPR-07-930

327 Deactivation Complete

September 7, 2007

***Functional Performance Requirements:*** A decontamination method is needed that minimizes worker exposure, secondary waste generation, cost, and risk. A method that cleans to a level supporting end point criteria is required (that is, remove contamination within the basins and canal to support facility transition end-state requirements. The high contamination areas may be cleaned to a level (i.e. less than 100kdpm) that allows use of fixatives. The method should be readily deployable and capable of being remotely operated.

If underwater stripping technology is not employed, some form of airborne contaminant containment is necessary. The decontamination technology must be capable of operation

on both vertical and horizontal surfaces. Removal of a fixative may also be required in most areas. The ability to collect and characterize contaminants as they are removed is also required.

***Work Breakdown Structure:***

1.04.10, 324/327 Buildings Stabilization/Deactivation

***TIP No.:*** N/A

***Justification for Need:***

***Technical:*** As facilities are transitioned to stable conditions and decommissioned, they require decontamination of radioactively contaminated materials. Current decontamination methods are often slow, costly, and produce secondary waste.

***Regulatory:*** N/A

***Environmental Safety and Health:*** Radioactive contamination presents safety/exposure concerns.

***Cultural/Stakeholder Concerns:*** The 327 Facility is located in close proximity to the Columbia River and the City of Richland; risk to the worker, public and environment should be minimized.

***Other:*** None identified.

***Current Baseline Technology:*** Hydro-lancing, ice/sand blasting, and scabbling

***End User:*** EM-40.

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